392.1 Lc

REPORT #5

NOTES

ON

SEASONAL HISTORY AND HABITS

OF

IPS CONFUSUS

ASHLAND AREA

LAMB'S MINE UNIT

PROJECT 15a

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REPORT # 5.

NOTES ON THE SEASONAL HISTORY AND HABITS OF

IPS CONFUSUS.

No very extensive records were kept on the seasonal history of this species. All of the broods which were closely followed were of the first generation in windfalls and trap trees. No records were kept on the overwintering generation.

CONDITIONS ON UNIT.

The present infestation on the Lamb's Mine Unit appears to have bred extensively in some tops and limbs on Section 22; left by wood cutters and the timber which was felled by a windstorm early in 1915. The beetles multiplying in this way heavily attacked the tops of larger trees, so that in the fall of 1915 and the spring of 1916 we had a large number of these trees which have been called "topkilled."

The increase in the infestation is as follows:

	Increase	Decrease
1915-1st generation.	74%	
1915-2nd generation.	79.4%	
1916-1st generation		43.3%

The decrease in 1916 is probably due to the lack of wind blown trees or other suitable material.

The 1915-2nd generation developed almost altogether in standing trees, either small trees or in the tops of maturer trees. There were 54 small trees and 192 larger "topkilled" trees representing this generation.

Of the "topkilled" trees 30 were climbed and examined and were all found to be infested with Ips confusus; 66 of the "topkilled" trees were later attacked by one or more species of insects and entirely killed.

THE ADULTS.

Food habits.

Ips confusus prefers to attack felled logs and where such are present they attack them so vigorously as to leave little room for D. brevicomis. It also attacks standing yellow pine and sugar pine saplings and the tops of older and mature yellow pine.

Attack.

From notes taken this year on the construction of the galleries, etc., the following extracts are taken:

Eggs per inch of gallery.

Tree No.	Inches of gallery	No. of eggs	Eggs per inch
207	4.5	32	7.1
	4	28	7
	4	38	7.8
	3	29	9.7
	3.25	27	8.3
	4	33	8.2
200	5	25	5.9
	4.5	37	8.2
	4.5	34	7.6
	12.5	66	5.3
	6.75	43	6.4
	10.5	69	6.6
	5	27	5.4
	71.5	481	6.72

Minimum 5.3 eggs per inch. Maximum 9.7 eggs per inch.

Tree No.	Attacks	Square feet	Attacks per sq. ft.
207	40	1	40
105	46	1	46
200	52	2.25	23.1
	138	4.25	32.5

Tree No.	Inches of gallery	Square feet	Inches per sq. ft.
207	380	2.25	169
200	592	3.25	182

Inches of gallery per attack -- 5.6 inches. Eggs per Sq. ft.--1222.

Average 4 parent adults per attack -- 130 per sq. ft.

Emergence.

Tree No.	Sq. feet.	Exit holes.	Emergence.
205	1	90	90 per Sq.ft.

The records on emergence are not sufficient, as exit holes were checked off and it is very probable that many adults emerge through a single hole. Bark will have to be caged in order to determine this point, as the Ips do not behave like D. brevicomis in each beetle emerging from a separate hole.

Brood Tables

Tree No.	Event No. a	Events b	First Event Period c	First Event Date d	Brood Period e	Duration Period f	Last Event Period g	Last Event Date h
23	1	Attack		107		7		114
	2	Eggs	7	114	7	7	7	121
	3	Larvae	11	125	18	9	13	134
	4	Pupae	9	134	27	29	29	163
	5	Adult	15	149	42	28	14	177
	6	Emerging	21	170	63	20	13	190
	7	Emerging Per.	20	190	83			
21	1	Attack		80		40		120
	2	Egg	9	89	9	41	10	130
	3	Larvae	25	114	34	21	5	135
	4	Pupae	21	135	55	21	21	156
	5	Adult	27	162	82	42	48	204
	6	Emerging	42	204	124	40	40	244
	7.	Emerging Per.	40	244	164			
20	1	Attack		107		21		128
	2	Egg	7	114	7	20	6	134
	3	Larvae	14	128	21	20	14	148
	4	Pupae	28	156	49	21	29	177
	5	Adult	14	170	63	20	13	190
	6	Emerging	7	177	70	27	14	204
	7	Emerging Per.	27	204	97			
32	4	Pupae						204
	5	Adult		182		35	13	217
	6	Emerging	15	197		47	27	244
	7	Emerging Per.	47	244				

Brood Tables Continued:

Tree No.	Event No. a	Events b	First Event Period c	First Event Date d	Brood Period e	Duration Period f	Last Event Period g	Last Event Date h
	1	Attack		104		17		121
	2	Egg	10	114	10	21	14	135
	3	Larvae	21	135	31	24	24	159
24	4	Pupae	41	176	72	28	45	204
	5	Adult	15	191	87	26	13	217
	6	Emerging	22	213	109	31	27	244
	7	Emerging Per.	31	244	140			
	1	Attack		163		14		177
	2	Egg	7	170	7	9	2	179
	3	Larvae	12	182	19	8	11	190
19	4	Pupae	11	193	30	7	10	200
	5	Adult	11	204	41	13	17	217
	6	Emerging	13	217	54	13	13	230
	7	Emerging Per.	13	230	67			
	3	Larvae						196
	4	Pupae		200		17	21	217
34	5	Adult	10	210		14	7	224
	6	Emerging	7	217		27	20	244
	7	Emerging Per.	24	258				
	4	Pupae		192		40		232
35	5	Adult	32	224		--		---
	6	Emerging	10	234		24		258
	7	Emerging Per.	24	258				
1916-Gen.								
	1	Attack	--	82		58		140
	2	Egg	6	88	6	72	20	160
	3	Larvae	31	119	37	56	15	175
78	4	Pupae	41	160	78	36	21	196
	5	Adult	15	175	93	35	14	210
	6	Emerging	21	196	114	42	28	238
	7	Emergence Per.	42	238	156			
	1	Attack	--	118		19		137
	2	Egg	5	123	5	--		---
	3	Larvae	17	140	22	23		163
205	4	Pupae	--	---	--	--		---
	5	Adult	--	182	64	13		195
	6	Emerging	8	(190)	72	17	12	207
	7	Emergence Per.	17	207	89			
	1	Attack	--	118		27		137
	2	Egg	13	123	13	27	13	(150)
	3	Larvae	14	137	27	35	22	172
200	4	Pupae	35	172	62	10	10	182
	5	Adult	19	191	81	1	10	192
	6	Emerging	3	194	84	13	15	207
	7	Emergence Per.	13	207	97			
201	1	Attack	--	123				
	2	Egg	14	137	14			
206	1	Attack	--	123				
	2	Egg	14	137	14			

Brood tables 1916 gen. Cont:

Tree No.	Event No. a	Events b	First Event Period c	First Event Date d	Brood Period e	Duration Period f	Last Event Period g	Last Event Date h
	1	Attack	--	123				
207	2	Egg	14	137	14			
	6	Emerging						240
	7	Emergence Per.		240	117			
	1	Attack	--	123				
	2	Egg	14	137	14			
208	3	Larvae	26	163	40			
	6	Emerging						231
	7	Emergence Per.		231	108			
	1	Attack	--	123				
	2	Egg	14	138	14			
	3	Larvae	26	163	40			
210	4	Pupae	--	---	--			
	5	Adult	--	---	--			
	6	Emerging	--	208	84	24		231
	7	Emergence Per.	24	231	108			
Ips confusus 1915-1st generation.								
	1	Attack				19.8		
	2	Egg	8		8	19.6	7.8	
	3	Larvae	16.6		24.6	16.9	13.4	
AVERAGES	4	Pupae	22		46.6	23.2	25.8	
	5	Adult	17.7		65.	25.4	17.8	
	6	Emerging	17.1		84.	28.6	22.	
	7	Emerging Per.	28.6		110			
Ips confusus 1916-1st generation.								
	1	Attack				34.7		
	2	Egg	18.8		11.8	49.5	16.5	
	3	Larvae	22.8		33.2	38	18.5	
AVERAGES	4	Pupae	38.		70.	23	15.5	
	5	Adult	17.		79.	16.3	12.	
	6	Emerging	10.7		88.5	24.	18.3	
	7	Emergence Per.	24					

GENERAL AVERAGE

1	Attack			27		
2	Egg	10	10	34	12	
3	Larvae	20	29	27	16	
4	Pupae	30	58	23	21	
5	Adult	17	71	21	15	
6	Emerging	14	86	26	20	
7	Emergence Per.	26	111			

BROOD TABLES.

The above brood tables are from 18 record trees, all of which represented the first seasonal generation.

The attack of this generation commences in the latter part of March, and during April. The beetles develop and emerge during July and August. The brood period as shown by the record trees, from first attack to first emerging, averages 86 days.

From the data so far collected it would seem that the generations of Ips confusus are much less complicated than those of D. brevicomis. The first seasonal generation develops in fallen timber from April to August, and the second generation then attacks the tops of thrifty and mature trees.

We have no record trees of the second generation, but from the examination of the topkilled trees in cruising it appears that there is a heavy emergence from these trees in March and April. No broods have been found overwintering in fallen timber, though this may only be a coincidence.

Diagram #1 is a plot of the record trees containing broods of Ips confusus.

NATURAL CONTROL.

Climate

The effect of heat and cold was not noted as in the case with D. brevicomis. However, as all stages have been found to overwinter it is doubtful if cold will kill them.

Disease.

Fungi of various kinds have been found in the galleries and pupal cells, and larvae and pupae have apparently been killed by it.

Parasites.

Two species of small chalcid parasites have been reared from Ips confusus. These have been identified by Mr. S. A. Rohwer as Spintherus sp. and Roptrocerus sp.

The parasites develop and emerge from the beetles at the time of pupation or before the adult beetles have formed.

These parasites have been found quite abundantly in the Ips infested logs.

Birds.

Woodpeckers destroy quite a number of beetles, especially on standing trees, very rarely disturbing the broods in logs.

Respectfully submitted,

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